Complete Summary

GUIDELINE TITLE

Indications for and techniques of red cell transfusion.

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Indications for and techniques of red cell transfusion. In: EBM Guidelines. Evidence-Based Medicine [CD-ROM]. Helsinki, Finland: Duodecim Medical Publications Ltd.; 2004 Mar 18 [Various]. [5 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Clinically significant (symptomatic) acute or chronic anaemia

GUIDELINE CATEGORY

Treatment

CLINICAL SPECIALTY

Family Practice
Hematology
Internal Medicine
Pathology

INTENDED USERS

Clinical Laboratory Personnel
Health Care Providers
Physicians

GUIDELINE OBJECTIVE(S)

Evidence-Based Medicine Guidelines collects, summarizes, and updates the core clinical knowledge essential in general practice. The guidelines also describe the scientific evidence underlying the given recommendations.

TARGET POPULATION

Patients in primary care settings who have clinically significant (symptomatic) acute or chronic anaemia

INTERVENTIONS AND PRACTICES CONSIDERED

1. Identification of patients who have indications for red blood cell transfusion
2. Use of physiological saline as first aide
3. Institution of peroral iron substitution therapy
4. Use of plasma constituents in addition to volume correction and red cell transfusion
5. Red cell transfusions, including selection of red cell concentrates in special cases
    - Red cell concentrate without leucocytes
    - Washed red cells (complement or immunoglobulin A [IgA] has been removed)
    - Red cells from a donor with IgA deficiency or five times washed red cells
    - Irradiated red cells
    - Typed red cells
    - Warmed red cells
6. Techniques of red cell transfusion
    - Blood sample for blood groups and compatibility test
    - Checking the blood unit
    - Checking the patient´s identity
    - Vital functions
    - Infusion techniques

MAJOR OUTCOMES CONSIDERED

Safety and adverse effects of red blood cell transfusions

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The evidence reviewed was collected from the Cochrane database of systematic reviews and the Database of Abstracts of Reviews of Effectiveness (DARE). In

addition, the Cochrane Library and medical journals were searched specifically for original publications.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

A. Strong research-based evidence. Multiple relevant, high-quality scientific studies with homogenic results.
B. Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.
C. Limited research-based evidence. At least one adequate scientific study.
D. No research-based evidence. Expert panel evaluation of other information.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of evidence [A-D] supporting the recommendations are defined at the end of the "Major Recommendations" field.

Basic Rule

Clinically significant (symptomatic) acute or chronic anaemia should be corrected by transfusion if there is no specific treatable cause or if the clinical condition requires rapid correction of the anaemia.

Indications for Red Cell Transfusion

- Red cell transfusion can be performed in primary care in the following cases:
    - After acute bleeding (e.g., epistaxis or wound) if the blood loss is between 20 and 40% of total blood volume.
        - Physiological saline can always be used as first aid in acute anaemia.
        - The general condition of the patient and underlying diseases should always be taken into account when deciding on the need for red cell transfusion. The haemoglobin concentration is just one of the criteria. In patients with ischaemic heart disease, even a small decrease in the haemoglobin may increase the risk of myocardial infarction.
        - If the patient has lost more than 50% of his/her blood volume, plasma constituents must be administered in addition to volume correction and red cell transfusion. Refer the patient to a specialized hospital.
        - If bleeding continues (in the gastrointestinal tract) the patient should be referred to a hospital where transfusions can be performed and the bleeding stopped endoscopically (see the Evidence-based Medicine [EBM] guideline Melena).
        - Peroral iron substitution (100 mg Fe^{++} x 2) should be started at once and continued for at least 2 months.
    - Chronic therapy-resistant (normovolaemic) anaemia (see the EBM guideline Secondary anaemia)
        - The main target is to maintain the patient's usual physical exercise capacity.
        - Transfusions are not routinely recommended for patients with malignant disease or severe systemic disease unless the transfusions can be expected to improve the patient´s condition or independence.
        - The transfusion threshold must be individually determined for each patient. Most patients have annoying symptoms of anaemia if the haemoglobin concentration is below 70 g/L. Transfusion of 2 to 4 units of red cells is usually performed. If the patient has cardiac or pulmonary symptoms, the threshold

haemoglobin value (determined by the symptoms) is higher. In some patients the haemoglobin concentration must be kept above 120 g/L, with the drawback that spontaneous red cell production may decrease and the interval between transfusions may be shortened.

Selection of the Red Cell Concentrate in Special Cases

- Red cell concentrate without leucocytes: correction of anaemia in patients who must avoid human leukocyte antigen (HLA) immunisation or cytomegalovirus infection
    - Aplastic anaemia or leukaemia
    - Before and after organ transplantation
    - Patients with suspected haematological disease
    - Paroxysmal nocturnal haemoglobinuria (PNH)
    - Pregnancy
    - Patients who have had a febrile reaction from leucocytes in a red cell concentrate (Gibis & Baladi, 1998; DARE-988596, 1999) [B]
- Paroxysmal nocturnal haemoglobinuria (PNH); washed red cells (complement has been removed)
- Deficiency of immunoglobulin A (IgA); washed red cells (IgA has been removed)
- Deficiency of IgA and anti-IgA antibodies; red cells from a donor with IgA deficiency or five times washed red cells
- Immunodeficiency associated with, for example, cytostatic drugs or immunosuppression; irradiated red cells (to prevent graft versus host reaction)
- Typed red cells if the patient has clinically significant antibodies
- The red cell unit should be warmed (+37 degrees C) before transfusion if the patient has cold agglutinins.

Techniques of Red Cell Transfusion

1. Take a blood sample for blood group and compatibility test.
    - Check the identity of the patient.
    - With the exception of emergencies, blood samples for blood group determination and compatibility tests should be taken at different times by different persons.
    - The samples should be stored in a refrigerator as whole blood. They remain analyzable for five days.
2. Check the blood unit
    - The blood group on the bag label corresponds to the blood group recorded in the patient's notes (see below).
    - Red cells from donors with other than identical (but compatible) blood groups can be used much more freely than whole blood products (see the EBM guideline on Erythrocytosis). The rules on acceptable incompatibility should be clear in advance.
    - Check the compatibility test: the numbers on the bag and on the tube should match (the compatibility test has been performed using the correct unit) and the compatibility test should have been recorded as performed.

3. Check the patient´s identity
4. Check vital functions (blood pressure, pulse, temperature) before the transfusion.
5. Infusion
    - The infusion needle should be sufficiently thick (e.g., a green Viggo® needle).
    - One unit (about 320 mL) is infused over 1 to 2 hours in a normovolaemic patient. Two units can be infused one after another; thereafter a break of a few hours is recommended, at least in elderly patients.
    - If the patient has heart failure and oedema or pulmonary congestion, 20 mg of furosemide should be administered intravenously during the transfusion of each unit.
    - Monitor the patient carefully, particularly during the first 15 minutes of the transfusion. For actions to be taken if a transfusion reaction occurs see EBM guideline on "Transfusion reactions."

Related Evidence

- There is no evidence that albumin administration would be beneficial for critically ill patients (hypovolaemia, burns, hypoalbuminaemia), and it may increase the risk of death (The Albumin Reviewers, 2002) [B].
- The risk of post-operative infections is increased two-fold if allogeneic blood is transfused rather than autologous blood (Duffy & Neal, 1996; DARE-973195, 2000) [C].
- Cell salvage appears to be effective in reducing the need for allogeneic red cell transfusion in adult elective surgery (Carless et al., 2003) [B].

Definitions:

Levels of Evidence

A. Strong research-based evidence. Multiple relevant, high-quality scientific studies with homogenic results.
B. Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.
C. Limited research-based evidence. At least one adequate scientific study.
D. No research-based evidence. Expert panel evaluation of other information.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Concise summaries of scientific evidence attached to the individual guidelines are the unique feature of the Evidence-Based Medicine Guidelines. The evidence summaries allow the clinician to judge how well-founded the treatment recommendations are. The type of supporting evidence is identified and graded for select recommendations (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Identification of patients with clinically significant (symptomatic) acute or chronic anaemia
- Appropriate selection and administration of red cell transfusions

POTENTIAL HARMS

- Transfusion reaction
- Transmission of infections

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Indications for and techniques of red cell transfusion. In: EBM Guidelines. Evidence-Based Medicine [CD-ROM]. Helsinki, Finland: Duodecim Medical Publications Ltd.; 2004 Mar 18 [Various]. [5 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2000 Mar 30 (revised 2004 Mar 18)

GUIDELINE DEVELOPER(S)

Finnish Medical Society Duodecim - Professional Association

SOURCE(S) OF FUNDING

Finnish Medical Society Duodecim

GUIDELINE COMMITTEE

Editorial Team of EBM Guidelines

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Authors: Editors

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Indications for and techniques of red cell transfusion. Helsinki, Finland: Duodecim Medical Publications Ltd.; 2000 Mar 30. Various p.

GUIDELINE AVAILABILITY

This guideline is included in a CD-ROM titled "EBM Guidelines. Evidence-Based Medicine" available from Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: info@ebm-guidelines.com; Web site: www.ebm-guidelines.com.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- EBM guidelines. Evidence-based medicine. Helsinki, Finland: Duodecim Medical Publications, Ltd. 2004. [CD-ROM]
- EBM guidelines. Web site: www.ebm-guidelines.com.

Available from: Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: info@ebm-guidelines.com; Web site: www.ebm-guidelines.com.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on December 17, 2002. The information was verified by the guideline developer as of February 7, 2003. This summary was updated by ECRI on July 15, 2004.

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